

H-Wing Neoumbilicoplasty: A New Technique for Advanced Abdominoplasty and Umbilical Zones by Gender

Alfredo E. Hoyos, MD^{1,2}
 Mauricio E. Perez, MD^{1,3}
 Ivan R. Mogollon, MD¹
 Andres Arcila, MD^{1,4}

Bogota and Barranquilla, Colombia;
 and Dallas, TX



Background: Multiple umbilicoplasty techniques have been described, even more after the advent of full tummy tuck procedures and the neoumbilicoplasty (X-shaped incision) described by the authors in a previous report. The authors decided to upgrade the technique (H-wing incision) because the former procedure is associated with relatively common complications. The authors report a case series of an upgraded technique for neoumbilicoplasty (H-wing technique), comparing its outcomes with their previous standard procedure (X-shaped incision).

Methods: The authors reviewed their records for neoumbilicoplasties performed between January of 2014 and December of 2019. The authors divided the procedures according to the surgical technique and performed a detailed analysis regarding timing, complications, uses, and quality standards according to patients' opinion through a nonstandardized survey.

Results: A total of 407 procedures were distributed between two techniques: X-shaped incision, 179 procedures; and H-wing technique, 228 procedures. The former was performed from January of 2014 to October of 2016 and the latter from September of 2016 to December of 2019. High satisfaction indexes were found for both procedures; however, fewer complications were seen in the H-wing group. The X-shaped incision is thought to generate a greater force of tension over the flaps compared to that from the H-wing technique, which consequently increased the risk of flap necrosis and flattening.

Conclusions: The H-wing technique for neoumbilicoplasty decreases the risk of postoperative complications such as dehiscence, skin necrosis, and navel flattening, and maintains high aesthetic standards and satisfaction indexes among patients. The technique can be used after either lipoabdominoplasty or secondary procedures. (*Plast. Reconstr. Surg.* 151: 52, 2023.)

The navel (from the Greek word *Omphalos*) is a unique scar that reminds of and identifies our origin as placental mammals. It has been identified as the body's energy center by many cultures around the world,¹ among other beliefs. Some scientific discussions and controversies have arisen around the paintings *The Creation of Adam* by Michelangelo and *The Creation* by Rubens where Adam and Eve, respectively, are represented with

a navel. Because they were not conceived or sheltered in a mother's belly, they should not have a navel at all. Nowadays, the cultural impact of the navel has transcended into the aesthetic level. It plays a fundamental role in both the abdominal harmony and as a medical landmark for physical examination and surgical planning.² Its value increased after the advent and popularity of abdominoplasty, to obtain aesthetically pleasant

From the ¹Total Definer Research Group; ²Dhara Clinic (private practice); ³private practice; and ⁴Universidad Simon Bolivar.

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results,^{3,4} in addition to the positive impact for patient satisfaction.²² In contrast, a poor technique or a wrong relocation after umbilicoplasty usually results in unnatural appearance and patient dissatisfaction^{5,6} (Fig. 1).

After Vernon¹ first report, multiple techniques and variations for umbilicoplasty have been described regarding incisions and particularly, describing anatomical points for navel reconstruction, usually based on fixed measures or pelvic landmarks.^{2,7} We are presenting our experience with a new procedure called the “H-wing” technique, based on our previously described “X-shaped incision” for neoumbilicoplasty.

PATIENTS AND METHODS

We reviewed our records looking for patients who underwent any neo-umbilicoplasty surgery at a single plastic surgery center (Dhara Clinic) in Bogota, Colombia, from January of 2014 to December of 2019. We divided the procedures into two groups, according to the surgical technique performed: (1) X-shaped incision; and (2) H-wing technique. A simple X-shaped incision was performed in the former and an H-incision



Fig. 1. A 53-year-old patient who complained of poor aesthetic results after omphaloplasty with an alternative technique. Note the navel's bizarre healing and the huge deformity in the lower flap, in addition to a visible scar after a full tummy tuck.

(because of the extended horizontal component) was performed in the latter. We gathered data for each group regarding their timing after abdominoplasty (immediate versus delayed), adverse effects, and the amount and type of complications. We also looked for other feasible indications for neoumbilicoplasty apart from abdominoplasty and analyzed the results of a nonstandardized survey for patient postoperative satisfaction.

Surgical Technique

After abdominoplasty, the neo-umbilicus can be done immediately or deferred, the latter to decrease the abdominal flap trauma and consequently the risk of necrosis.² The choice depends on the flap tension and thickness after tummy tuck and liposuction. Both of these factors are evaluated by the surgeon intraoperatively, and if the surgeon decides to, the neoumbilicoplasty will be performed once the abdominal drain is removed (Blake; Ethicon, Inc., Johnson & Johnson, Somerville, NJ), which usually occurs when the drainage is less than 50 mL in a period of 24 hours.

We followed the concept of the umbilical ideal zone for women⁸—defined as the area delimited over the midline from the xiphoid process to the pubis, between the midpoint and the junction of the two upper thirds with the lower third (Fig. 2). We defined an umbilical ideal zone for the male patient delimited between the union of the upper two-thirds with the lower third and the union of the upper three quarters with the lower quarter (Fig. 3). The male patient has a preference for muscularity in the abdomen, and the lower torso is anatomically broader compared to that of a woman, which results in a usual preference of a lower navel location as well. As a result, we believe the navel should be located higher or lower depending not only on the clinical characteristics (e.g., age, sex, height, previous abdominal scars) but also patient preference.^{2,9,10} The umbilicus location must be marked preoperatively along with areas for additional liposuction if high-definition liposculpture was requested (Fig. 4).

X-Shaped Incision Technique

A cross-shaped incision, with 60 degrees in the apex angles, is performed across the midline deep enough to reach the rectus abdominis fascia. Upper incisions must be 10 mm long, and lower ones 5 mm. As a result, four triangular flaps appear: superior, inferior, left, and right. The three lower flaps are sutured with a continuous subcuticular stitch and fixed upward to the abdominal fascia in

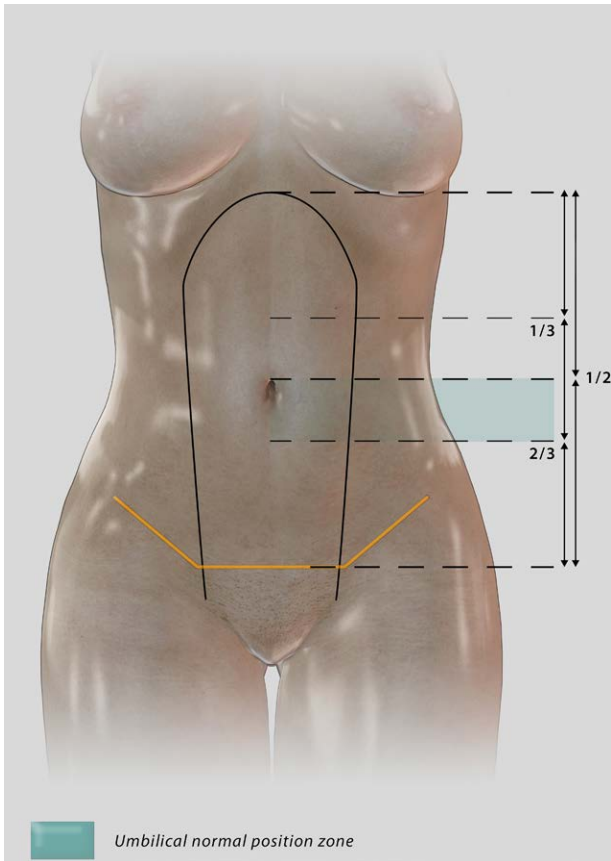


Fig. 2. Ideal umbilical zone in women. Area delimited over the midline (green) from the xiphoid process to the pubis, between the midpoint and the joint of the two upper thirds with the lower third.

a spot located on the base of the upper flap. The superior flap is then fixed loosely to the fascia, in a perpendicular way (Fig. 5).

H-Wing Umbilicoplasty

Preoperative marks are drawn after determining the new navel position; then, liposuction over the superficial and deep layers can be performed for extra fat resection. Similar to the X-shaped technique, an H-shaped incision is made by performing an extended-horizontal component rather than a vertex. This results in a superior flap (10 mm long in its lateral borders), two 5-mm triangular lateral flaps, and an inferior flap (5 mm long in its lateral borders). The subcutaneous tissue is dissected vertically in the upper flap, whereas bevel dissection is performed for the lower flap. An oval-shaped adipose tissue resection is made underneath the incisions. A first dermal stitch (Polyglactin 910) is fixed from the inferior flap free border towards the abdominal fascia at the base of the superior

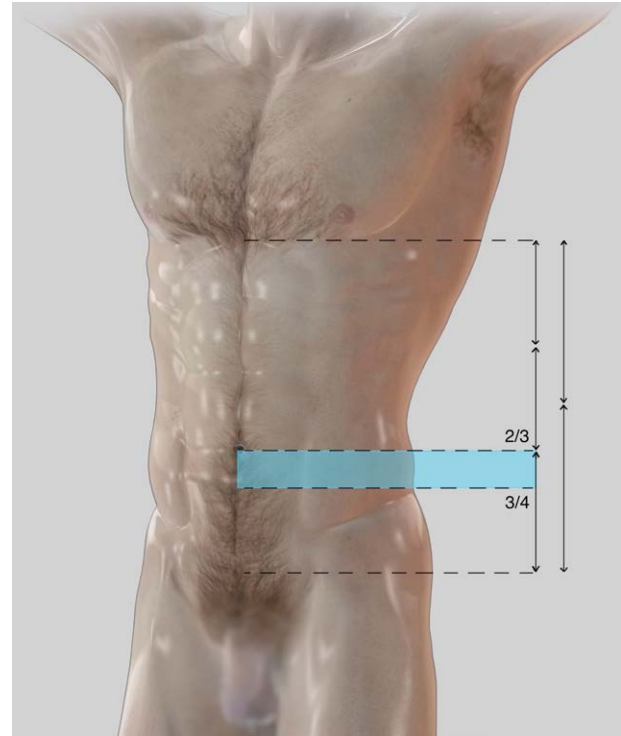


Fig. 3. Ideal umbilical zone in men. Area delimited over the midline (blue) from the xiphoid to the pubis, by the union of the upper two-thirds with the lower third, and the union of the upper three quarters with the lower one.

flap. A second stitch (Polyglactin 910) ties both lateral flap tips (dermal) to the fascia, by passing underneath the inferior flap and fixing them 2 to 3 mm away from the first stitch. Finally, the superior flap is gently fixed to the abdominal fascia in a vertical fashion (poliglecaprone 25). We use a higher tensile suture for the first two stitches, as they will set the height and depth of the umbilicus, whereas a lesser tensile one is used for the superior flap due to the low tension it will be subject to (Fig. 6). [See Video (online), which demonstrates the step-by-step H-wing neoumbilicoplasty technique.]

All patients received 1 g of cefazolin, 8 mg of ondansetron, 75 mg of diclofenac, and 50 mg of tramadol during the procedure. A round-shaped gauze is imbedded in topical antibiotic (nitrofurazone) and left in the wound for 1 week; then, it is replaced with a marble or a silicone belly button shaper and left for 2 more weeks (Fig. 7). Loose garments and a foam vest must be worn for 4 to 6 weeks following lipoabdominoplasty. After neoumbilicoplasty, the garments must be used for 2 to 4 extra weeks. Photographs were taken before and 2 days and 1, 3, and 6 months postoperatively.

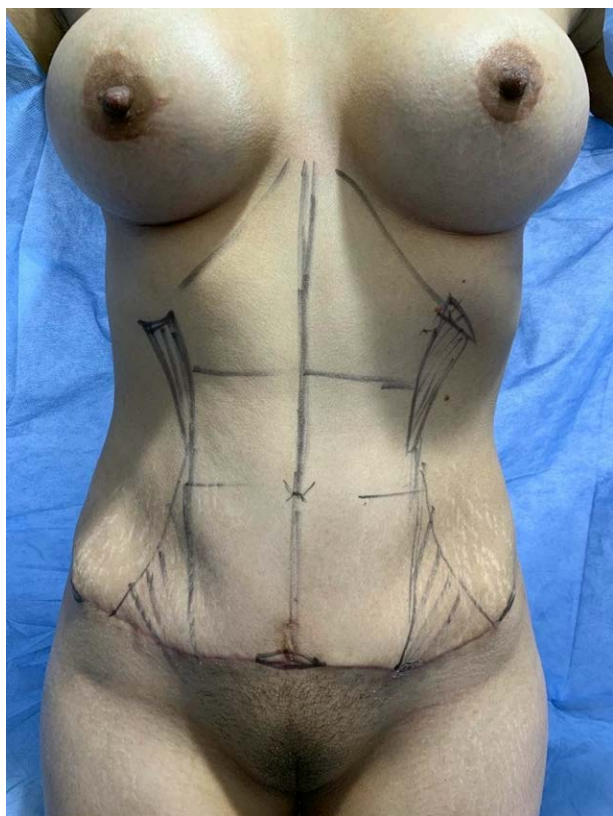


Fig. 4. Surgical markings. The neoumbilicus position is determined according to the patient's preference, age, and sex; areas for additional liposuction can be drawn as well (high-definition liposculpture).

RESULTS

A total of 407 consecutive neoumbilicoplasty procedures were performed by the first author (A.E.H.) within the specified time. Only two approaches were documented: X-shaped incision ($n = 179$) and H-wing technique ($n = 228$). The former technique was performed between January of 2014 and October of 2016, whereas the latter was performed between September of 2016 and December of 2019 (Figs. 8 through 11). A short overlap period was observed because of the high volume of procedures and patients who requested either of the two procedures. Regarding the 228 patients who underwent H-wing neoumbilicoplasty, the mean age was 37 years, 80.3% were female, and 19.7% were male. It was immediately performed in 105 cases (46%) and delayed in 123 cases for at least 1 week after abdominoplasty and performed within the first 2 postoperative months. The overall rate of complications for the H-wing technique was 11% ($n = 25$). Most of them were minor complications, which included seroma, prolonged bruising, and swelling. All of them resolved with manual postoperative massage. Only two cases (0.8%) of partial wound dehiscence were documented and resolved through secondary healing. One case of complete dehiscence resulted in a flattened umbilicus, which required reintervention. Two patients (0.8%) developed a hypertrophic scar 3 to 4

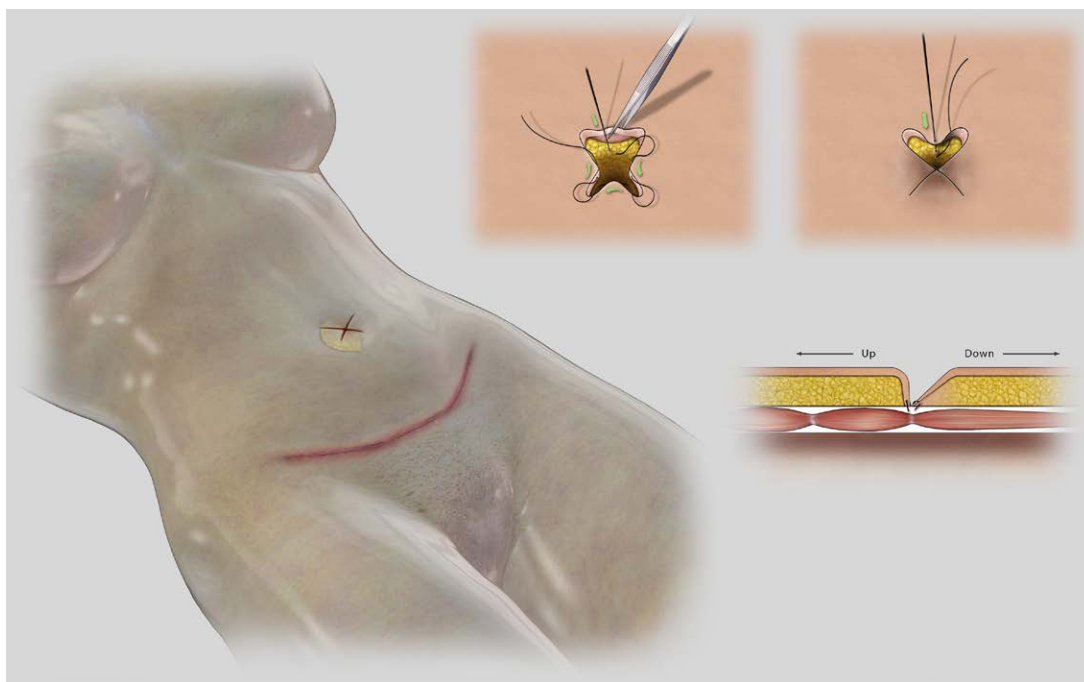


Fig. 5. X-shaped incision technique. A cross-shaped incision is done across the midline, resembling the shape of a butterfly. Upper incisions must be 10 mm long and lower ones 5 mm. Four triangular flaps result. The three lower flaps are sutured with a continuous subcuticular stitch and fixed upward to the abdominal fascia in a spot located on the base of the upper flap. The superior flap is then fixed loosely to the fascia, in a perpendicular way.

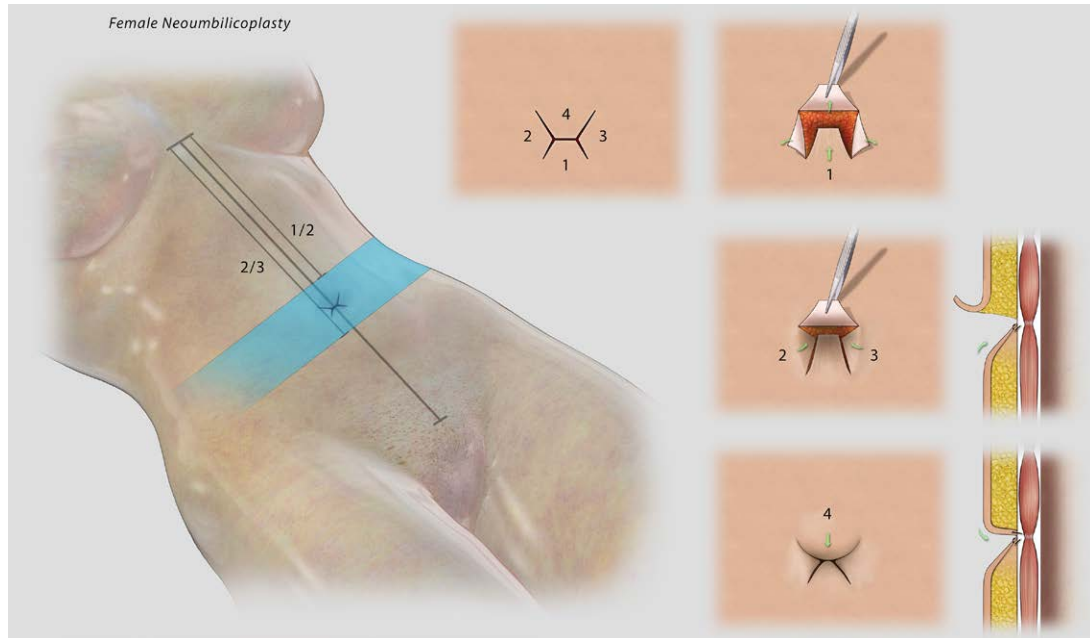


Fig. 6. H-wing neumbilicoplasty. The ideal umbilical zone in women is represented by the *blue rectangle* and the midline. First, the H-incision produces four flaps: one upper flap (4), two lateral flaps (2 and 3), and one inferior flap (1). Then, the lower flap free border (1) is fixed toward the abdominal fascia at the base of the superior flap (4). A second stitch fixes both lateral flaps (2 and 3) to the fascia, by passing underneath the inferior flap (1) and anchoring them 2 to 3 mm away from the first stitch. Finally, the upper flap (4) is gently fixed to the abdominal fascia in a vertical fashion.

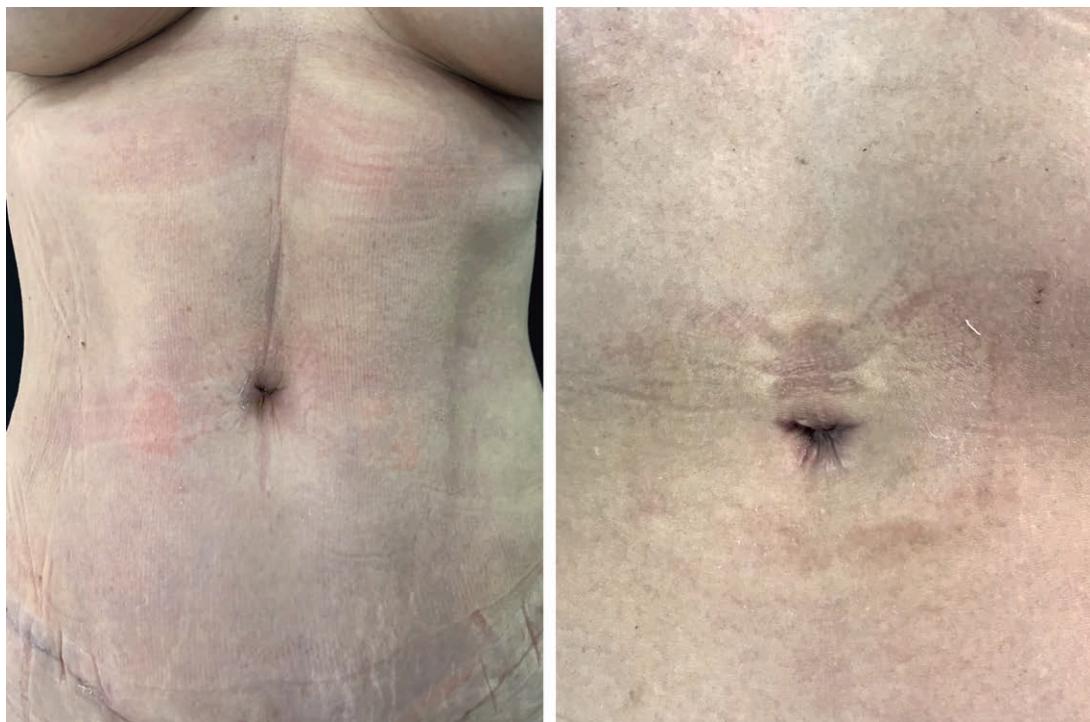


Fig. 7. Close up. A 35-year-old woman who underwent a full tummy tuck. H-wing neumbilicoplasty was delayed for 2 weeks to protect the flap perfusion. High-definition liposculpture was performed as well. Notice the natural and almost normal appearance of the navel in the 4-week postoperative photograph (*left*), whereas the 6-month postoperative one (*right*) shows the deepness and typical look of the new navel.



Fig. 8. (Left) Preoperative view of a 44-year-old woman with moderate abdominal skin laxity, abundant striae, and a low-positioned navel. A full abdominoplasty plus immediate H-wing technique neoumbilicoplasty was performed in addition to high-definition liposculpture, with approximately 4700 cc of lipoaspirate. (Right) The 3-month postoperative photograph shows a higher neoumbilicus location, which ensures a youthful and athletic appearance of the abdomen and torso.

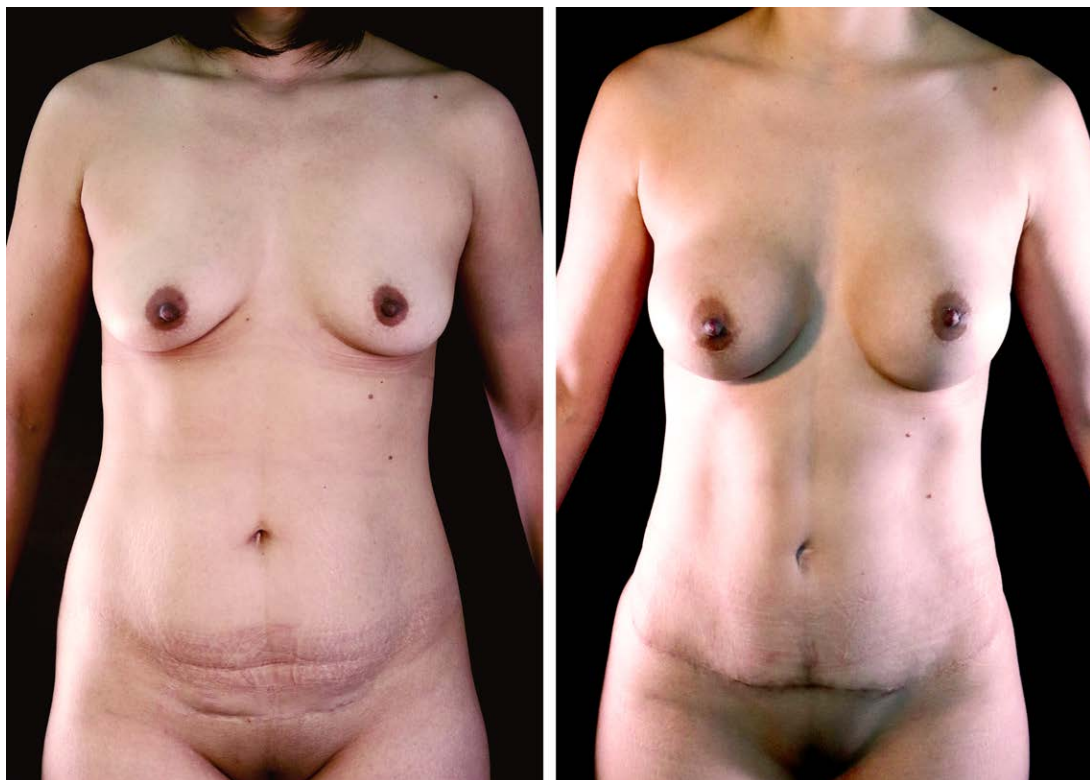


Fig. 9. (Left) Preoperative view of a 36-year-old female patient with inferior-predominant abdominal skin laxity and an odd intraumbilical scar. She underwent a full lipoabdominoplasty with immediate H-wing umbilicoplasty plus high-definition liposculpture. (Right) The 3-month postoperative photograph shows the new oval-shaped juvenile umbilicus and an athletic appearance of the abdomen.



Fig. 10. (Left) Preoperative view of a 54-year-old male patient who underwent a high-definition transverse plication, undermining, liposuction, umbilicoplasty, and abdominoplasty procedure with immediate H-wing neoumbilicoplasty. Gynecomastia resection was achieved by inverted-omega open resection. (Right) The 6-month postoperative photograph shows a new, round, youthful-looking umbilicus compared to the deep and linear appearance of the preoperative one.



Fig. 11. (Left) Preoperative view of a 42-year-old female patient with global abdominal skin laxity and an oddly shaped umbilicus because of a prior vertical infraumbilical laparotomy. She underwent a full lipoabdominoplasty with immediate H-wing umbilicoplasty plus high-definition liposculpture. (Right) The 12-month postoperative photograph shows the new round juvenile umbilicus and an athletic appearance of the abdomen.

Table 1. Complication Rates and Their Assessment Regarding X-Shaped Incision and H-Wing Techniques for Neoumbilicoplasty

No. Complication	X-Shaped Incision (n = 179)		H-Wing Technique (n = 228)	
	Immediate	Delayed	Immediate	Delayed
No. Complication	88 (48.9%)	91 (51.1%)	105 (45.2%)	123 (54.8%)
Seroma	4/88 (4.5%)	2/91 (2.1%)	3/105 (2.8%)	2/123 (1.6%)
Prolonged bruising	4/179 (2.2%)	2/179 (1.1%)	3/228 (1.3%)	2/228 (0.9%)
Prolonged swelling	6/88 (6.8%)	4/91 (4.3%)	4/105 (3.8%)	2/123 (1.6%)
Dehiscence	6/179 (3.4%)	4/179 (2.2%)	4/228 (1.7%)	2/228 (0.9%)
Flattened umbilicus	8/88 (9.0%)	3/91 (3.2%)	6/105 (5.7%)	1/123 (0.8%)
Hypertrophic scars	8/179 (4.5%)	3/179 (1.7%)	6/228 (2.6%)	1/228 (0.4%)
Local infection	7/88 (7.9%)	3/91 (3.2%)	3/105 (2.8%)	0 (0.0%)
Flap necrosis	7/179 (3.9%)	3/179 (1.7%)	3/228 (1.3%)	0 (0.0%)
Total	3/88 (3.4%)	1/91 (1.0%)	1/105 (0.9%)	0 (0.0%)
	3/179 (1.7%)	1/179 (0.6%)	1/228 (0.4%)	0 (0.0%)
	3/88 (3.4%)	2/91 (2.1%)	1/105 (0.9%)	1/123 (0.8%)
	3/179 (1.7%)	2/179 (1.1%)	1/228 (0.4%)	1/228 (0.4%)
	2/88 (2.2%)	1/91 (1.0%)	1/105 (0.9%)	0 (0.0%)
	2/179 (1.1%)	1/179 (0.6%)	1/228 (0.4%)	0 (0.0%)
	2/88 (2.2%)	0 (0.0%)	0 (0.0%)	0 (0.0%)
	2/179 (1.1%)	0 (0.0%)	0 (0.0%)	0 (0.0%)
	34/88 (38.6%)	16/88 (18.2%)	19/105 (18%)	6/123 (4.9%)
	34/179 (19%)	16/179 (8.9%)	19/228 (8.3%)	6/228 (2.6%)

months after surgery and were treated with local massage and topical betamethasone. Neither flap necrosis nor infections were reported for H-wing technique, whereas two cases (1.1%) of flap necrosis were reported for the X-shaped group. Further details are summarized in Table 1.

In addition, we gathered data through a non-standardized survey answered by most patients (n = 361) to evaluate their postoperative satisfaction. Scores are registered and compared between groups in Table 2.

DISCUSSION

The best navel location for patients undergoing umbilicoplasty has been a matter of debate among plastic surgeons regarding its aesthetic outcomes; still, there is no consensus, and most surgeons have leaned toward either of the following three locations: (1) the point measured from distal to proximal at 60% of the distance over a line between the pubis and the xiphoid process¹¹;

(2) the intersection point between the midline and a line crossing both anterosuperior iliac spines¹²; or (3) a point located 15 cm above the pubic bone over the midline.¹³ In consideration, iliac crests and the fixed 15-cm distance could have huge variations among patients because of anatomical and demographic features such as height, weight, age, sex, race, ethnic group, and, even more, the patient's preference. Experience has demonstrated that it is better to consider an area (umbilical ideal zone) instead of a point, in which the umbilicus should be placed for neoumbilicoplasty procedures. Thus, we have come to conclude that the longer the torso or the younger the patient, the higher the umbilicus location should be. By contrast, older patients and those with a visually shorter torso (male patients and women with breast ptosis) might be eligible for a lower navel location, which also results in male satisfaction rates that support our theory about the umbilical ideal zone difference between sexes.

The overall rate of complications was higher in the immediate umbilicoplasty group (76%) versus delayed (24%) for both techniques, but its frequency was further decreased with the modification into the H-wing technique. Then, the question remains whether all procedures should be delayed, although the rate of complications is still low. Moreover, immediate umbilicoplasty might end up in a higher incidence of complications such as seroma, bruising, and swelling, because of the abdominoplasty itself rather than the navel procedure. Our previous technique for neoumbilicoplasty (X-shaped) was based

Table 2. Satisfaction Index^a

	X-Shaped Incision	H-Wing Technique
No.	147 (82%)	194 (85%)
Score value		
Poor results	0 (0%)	0 (0%)
Below expectations	1 (0.7%)	1 (0.5%)
Average	13 (8.9%)	11 (5.7%)
Good results	23 (15.6%)	33 (17%)
Above expectations	110 (74.8%)	149 (76.8%)

^aMost patients from either the X-shaped incision group (147 of 179) or the H-wing technique group (194 of 228) answered a non-standardized survey to score the neoumbilicoplasty outcomes.

on a stitch through the lower flap and the two lateral flaps, in which the force of distribution did generate greater tension and consequently increased the risk of flap dehiscence and necrosis, compared to that from the H-wing technique (Table 1). In the latter, the flaps are fixed with two stitches, one from the lower flap to abdominal fascia and other between the lateral flaps, obtaining a better distribution of tension and efficiently reducing the tension of the lower flap. The end result was the reduction of dehiscence and necrosis and prevention of hypertrophic scarring (Fig. 12). Furthermore, umbilicus flattening was more frequent among patients who underwent immediate umbilicoplasty compared to that from the delayed procedure, which supports our theory that flap tension and perfusion are severely affected with immediate procedures. In contrast, hypertrophic scarring and keloids must be carefully addressed during preoperative and postoperative evaluations to achieve an early intervention. Up to date, tummy tuck techniques (advanced abdominoplasty) go beyond the classic procedure (navel repositioning) by improving the body contour and the aesthetic outcomes by allowing further muscular definition over the abdominal flap (e.g., high-definition liposculpture) with the aid of new technologies for skin

tightening and the delay in the neoumbilicoplasty procedure. However, their discussion and details evidently overcome the purpose of this article.

Because our population has remained the same over the past 20 years, we only analyzed complications between both techniques and did not analyze demographic data; therefore, we focused our article only on comparing complication rates. The lack of inferential statistical analysis decreases the power of our study; however, clear differences can be seen among data.

High satisfaction indexes were found for both procedures (Table 2), with a trend towards better outcomes for the H-wing technique (90% versus 94%), which agrees with the lower rate of complications. Furthermore, the H-wing technique was used for secondary umbilicoplasty in previous umbilical deformities, failed neoumbilicoplasties, and scarred navel, with very good outcomes (Fig. 13), which could settle the basis for future studies on abdominal wall reconstruction surgery rather than just for aesthetic purposes.

CONCLUSIONS

The navel is an essential constituent of the abdominal aesthetics, so its reconstruction has to be meticulously performed to reach optimal outcomes. The concept of an ideal umbilicus

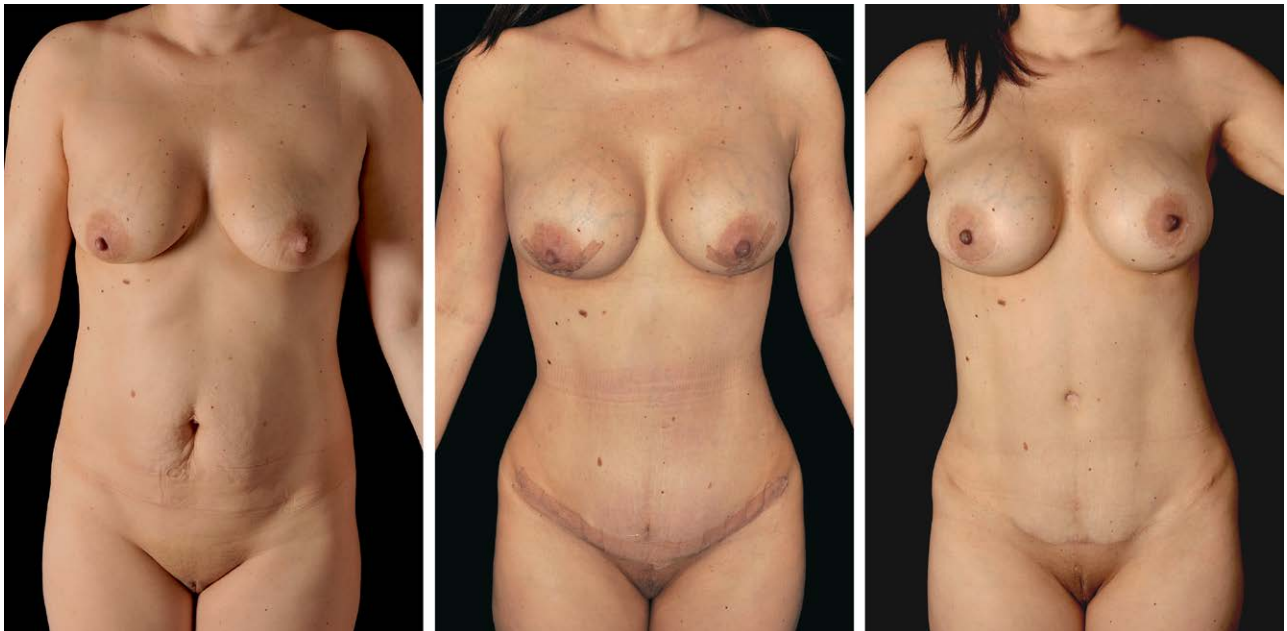


Fig. 12. (Left) The preoperative photograph of a 34-year-old woman with redundant skin flap in the central and infraumbilical abdominal regions, abundant striae, and a low-positioned umbilicus. She underwent a full tummy tuck procedure (center) with a neoumbilicoplasty delayed for 3 weeks (right). Such deferral allowed us to perform further muscular definition, while protecting the abdominal flap perfusion. (Right) New athletic appearance with a higher-positioned neoumbilicus, which enhances the youthful appearance of the abdomen.

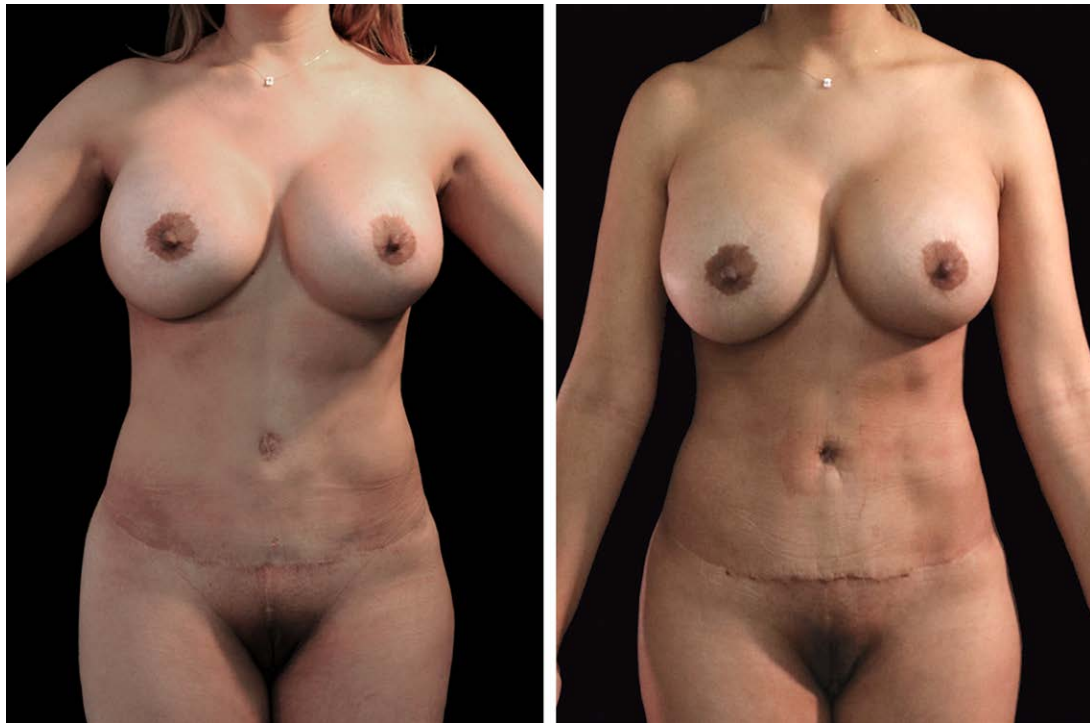


Fig. 13. (Left) This 37-year-old woman underwent a classic abdominoplasty plus umbilicoplasty with a skin graft (foreign institution), which resulted in a flattened and abnormal-appearing umbilicus. The abdominal flap advancement after the revision abdominoplasty allowed us to resect a small portion (horizontal) at the center of the umbilical scar. Then, the H-wing neoumbilicoplasty was performed by further extending the oblique cuts approximately 2 to 3 mm, and then pulling the inferior and lateral flaps a bit upper and deep toward the fascia to improve the neoumbilicus shape and depth. (Right) The 4-month postoperative photograph shows a restored abdominal wall with not only a natural and juvenile appearance but also an athletic one after high-definition liposculpture.

zone instead of a fixed point allows the surgeon to choose the best location considering the patient's demographics and preferences. The H-wing technique for neoumbilicoplasty is a safe and reproducible procedure that reduces the risk of complications and maintains high aesthetic standards. This technique was successfully performed for secondary procedures as well. Further studies must be carried out to support our findings and possibly extrapolate our technique for abdominal wall reconstruction surgery.

Alfredo E. Hoyos, MD
Carrera 15, no. 83-33, Suite 304
Bogotá 110221, Colombia
alhoys@gmail.com
Instagram: @alfredohoyosmd
Twitter: @alfredohoyosmd

PATIENT CONSENT

Patients provided written informed consent for the use of their images.

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